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(56) Documents Cited

**GB 2142874 A GB 1420547 A EP 0444387 A
EP 0105857 A EP 0089327 A US 4813351 A**

(58) Field of Search

**UK CL (Edition L) B6C CBQB CBQD CSAC CSAD
INT CL⁵ B41F
ON-LINE DATABASE : WPI**

(54) Screen printing apparatus.

(57) The screen printing apparatus includes a screen frame which supports a screen of natural or artificial fabric or metal mesh, a squeegee to force ink through unsealed portions of the screen, and a tunnel supplied with heated air for drying workpieces fed on a transporting belt.

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THE SCREEN PRINTING

This invention relates to the art of printing to extend its field to the hard, cylindrical and circular surfaces of the materials.

The present invention comprises a piece of thin screen or gauze board including silk, artificial silk, polyester or terylene, nylon, 5 organdie, cloth, stainless steel, phosphor-bronze, metal and the like, a frame, a sticky colour ink, a plastic squeegee, a photo stencil film or photo sensitive film, a gelatine mixture or photo sensitized solution, a folded hot blowing tunnel with transporting belt, a manual, semi or integral auto screen printing press or machine employed by press, 10 printery, print-works, electronic factory, advertising company, painter or calligrapher, publisher and other firms or factories.

The principal object of this invention is to provide the simple, economical and practical means for the art of printing to transfer the painter, calligrapher and designer's real autographies to a required or 15 ideal material or printed matter, the size of which may be as big as required transferring to the hard, cylindrical and circular surfaces of the materials.

To this end, it is provided that this art of printing is formed by silk, frame, ink and squeegee four main parts and the sticky colour 20 ink is either able or unable to infiltrate a sealed and/or unsealed picture arranged or drawn in the screen or gauze board which is constituted by a piece of silk, artificial silk or terylene or polyester, organdie, nylon, cloth, stainless steel, phosphor-bronze, metal and the like gauze being tightly mounted on one side of a square or rectangular 25 frame made by metal, wood or plastics and the tiny apertures between the cross junctions of the thin interlaceable threads of silk or lines

of gauze being entirely and thinly sealed with a weak any dry adhesive smooth solution or fluid on the flat affixed side to be the main print-board. Then a drawing pen wetted with a solvent, liquid or fluid which is enabled to dissolve the sealed solution or fluid is employed to draw
5 a picture or to write some words or calligraphy on the frame side of a screen to release that sealed solution displaying the tiny apertures of silk in an area of picture to be a transparency integrally as its other part is still sealed by the solution to form a required printing screen similar to a positive film. On the other hand, the sticky colour ink is
10 unable to infiltrate the sealed picture other than its unsealed part or parts, another form of picture or printed matter is then constituted as a negative film to reverse a black and white as transferred. according to the invention, a figure, picture, word, calligraphy or design which may be copied to the sealed screen is entirely transpierced with a lot
15 of tiny aperture by a pin or needle displaying the transparent design in a screen to enable the ink transferring to the printed materials.

In other aspect, a waxpaper, paraffin wax or clay may also be employed to in lieu of the weak solution to seal the apertures of screen, on the waxed or sealed side of which a picture may be engraved or transpierced or drawn with a needle, pin, pen, pencil, ball point pen without ink or stick until a required picture is transparent and displaying
20 the silky apertures. It is provided that a picture is drawn in the wax paper, to the waxed side of which the flat side of a screen is faced to lay these plainly on the flat surface, a hot iron is then employed to
25 melt the wax until which is entirely melted and sealed those apertures between the silky threads ideally. Release the paper before such melten wax is cold or concreted to complete a required screen printing board.

According to the invention, a figured paper or thin plastic paper may be cut to seal a part of the screen arranged as its original figure consisting of the sealed and unsealed parts for printing.

5 In another aspect, a sticky photo sensitive fluid, solution or gelatine mixture which is employed in the dark room for the sequence of the photographic processes may be in lieu of a photo sensitive film or photo stencil film in the field of printing as it is uniformly swept on the flat side of screen or on one side of a transparent plastic paper. After the required sensitizing, exposing and developing processes are
10 completed in sequence, the same effect will be obtained as the adhesive solution of a photo sensitive film or photo stencil film seals a sensitized part of the picture and the other part of which is lost to seal remaining transparent in a screen to be a printing board for this art of printing. It is provided that the sticky solution side of this positive film is up laying plainly to the hard smooth surface and being
15 covered and pressed by the flat side of the screen, in which, until the solution is entirely adhered and dried. The thin plastic paper is then to be taken away to transfer a sealed and unsealed picture having been exposed to the screen for printing, the technique of which may be widely
20 employed in the electronic printed circuits and other printing requirements and extending to the field of precise microelectronics.

According to the invention, a squeegee which is another important part of the screen printing may be made by elastic plastics, cardboard, rubber, resin, leather, fibric board or wood, one side of which is
25 bedded in the metallic, plastic or wooden handle and the other side is plain or sharp enabling to shave the picture surface on the frame side of a screen with the sticky colour ink smoothly throughout the length.

The size may be as wide as a required printing part. The screen printing ink which is another main part of this invention is a kind of sticky or adhesive fluid, solution, liquid or mixture mixed with the easy dry oil, hue, sticky plant juice, gum, resin, molten plastics or PVC in weak jelly form, the nature of which is integrally dissolved in liquid, water, fluid, resin or turpentine.

According to the operation of the invention, it is provided that as the flat side of the screen is closely pressed onto the surface of the printing material by a squeegee shaving on the frame side with the sticky colour ink, a transparent picture may so be transferred to the material to be a printed matter which may then be put to the slow running transporting belt driven by a motor or machine to carry it one by one passing throughout the hot blowing folded tunnel, inside which the wind blower with an adequate heating or thermoelectric element, quartz lamp, radiating lamp or radiator is installed to be a hot drier and so throughout which a canvas, plastics or a soft bearing hot and tough or metallic material is covered externally and the internal layer made by the metal foil or pewter foil is affixed inside. The layer is employed for reflecting and retaining the heat for quicker drying process. These printed matters can then be dried in a shortest period and may be collected in its outlet. This hot tunnel can be folded and is widely and ideally employed in the food and cloth or other manufactures for drying process and may be easier for storing up, moving or carrying as the required products or printed matters being sufficient.

CLAIMS

1. A screen printing comprising a screen or gauze board, squeegee, ink, photo stencil film, photo sensitized film, photo sensitive fluid or solution, gelatine mixture and folded hot blowing tunnel with transporting belt, said screen being a part of printing constituted by a piece of silk, artificial silk, polyester, terylene, nylon, organdie, cloth, stainless steel, phosphor-bronze, metal and the like is tightly mounted to a metallic, wooden or plastic frame and sealed by sticky weak solution, fluid, paraffin wax, clay, waxpaper, paper or plastic paper which is dissolved by solvent, fluid, liquid, cutting, engraving or transpiercing to form the sealed and unsealed means.
2. A screen printing according to claim 1, wherein a photo stencil film or photo sensitized film is employed for the sequence of sensitizing, exposing and developing of the photographic processes to seal and unseal a screen with the adhesive sensitized solution.
3. A screen printing according to claims 1 and 2, wherein a photo sensitive solution or fluid or gelatine mixture is entirely in lieu of the photo sensitized film for the sequence of photographic processes to form the sealed and unsealed screen.
4. A screen printing according to claims 1 to 3, wherein the plastic squeegee with a handle is a part of the printing.
5. A screen printing according to claims 1 to 4, wherein screen printing colour ink being a part of printing is a sticky solution, fluid or mixture dissolved in water, fluid, liquid, turpentine or resin.
6. A screen printing according to claims 1 to 5, wherein the transferring part of a screen is unsealed & transparent with a lot of tiny aperture of the silky threads or gauzy lines.

7. A screen printing according to claims 1 to 6, wherein the transferring part of a screen is sealed with solution or fluid without tiny apertures of the silky threads or ganzy lines.
8. A screen printing according to claims 1 to 7, wherein the screen printing press or machine is controlled by manual, semi-automation or integral automation.
9. A hot tunnel according to claims 1 and 8, wherein the cover can be folded consisting of an internal layer made by a heat reflecting or radiating metallic foil throughout the length.
10. A hot tunnel according to claims 1, 8 and 9, wherein a transporting belt is driven by a motor or machine in a low speed throughout the required length.
11. A hot tunnel according to claims 1 and 8 to 10, wherein the blower with a heating or thermoelectric element, radiator, radiating lamp or quartz lamp is installed inside for the drying process.

Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

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Relevant Technical fields

(i) UK CI (Edition L) B6C: CSAC, CSAD, CBQB, CBQD

(ii) Int CI (Edition 5) B41F

Search Examiner

A DAVEY

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

Date of Search

1 APRIL 1993

Documents considered relevant following a search in respect of claims 1-11

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2142874 A (WRIGHT) see eg Figures 1, 2	1
X	GB 1420547 A (ARGON) whole document	1
X	EP 0444397 (TOSHIN) column 8 lines 35-38	1
X	EP 0105857 (SVECIA) whole document	1
X	EP 0089327 (SVECIA) see Figure 5	1
X	US 4813351 (PRECO) see eg Figure 1	1

Category	Id of document and relevant passages	Relevant to claim(s)
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Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&c Member of the same patent family, corresponding document.

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